



Roy F Weston, Inc.
Suite 5700
700 5th Avenue
Seattle, WA 98104-5057
206-521-7600 • Fax 206-521-7601
www.rfweston.com

MEMORANDUM

DATE: 23 December 1998
TO: David Bennett, WAM, U.S. EPA, Region X
FROM: Michelle Turner, Chemist, WESTON, Seattle
~~cc:~~ Roger McGinnis, Senior Environmental Chemist, WESTON, Seattle

SUBJECT: Validation of Inorganics Data
Laboratory Batch: K9805693
Site: Duwamish River

WORK ASSIGNMENT NO.: 46-23-0JZZ

WORK ORDER NO.: 4000-019-038-5200-00

DOC. CONTROL NO.: 4000-019-038-AAAK

cc: Bruce Woods, RAP-WAM, U S EPA, Region X
Dena Hughes, Site Manager, WESTON, Seattle (memo only)
Kevin Mundell-Jackson, Database Management, WESTON, Seattle

The quality assurance review of fourteen sediment samples, laboratory batch K9805693, collected from the Duwamish River has been completed. The sediment samples were analyzed for inorganics by Columbia Analytical Services of Kelso, Washington using EPA Methods 200, 6010, 6020, and 7000 series as required to achieve detection limit goals. The samples were numbered:

98344086	98344087	98344088	98344089	98344090
98344091	98344092	98344093	98344094	98344095
98344096	98344097	98344098	98344099	

Data Qualifications

The following comments refer to the laboratory performance in meeting the quality control criteria described in the technical specifications of the laboratory subcontract. The review

This document was prepared by Roy F Weston, Inc expressly for the EPA. It shall not be disclosed in whole or in part without the express, written permission of the EPA.





QA Review Batch K9805693 (Inorganics/Metals)

Site: Duwamish River

Page 2

follows the format described in the U.S. EPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA OSWER 9240.1-05-01, February 1994) modified to include specific requirements of the analytical methods.

1. Holding Times

Holding times of 28 days for mercury and six months for other metals (from date of collection to analysis) were established in the project Sampling and Analysis Plan. All samples met holding time criteria.

2. Calibration

a) Initial Calibration

Initial calibration frequencies and QC criteria were met for ICP and ICP/MS analyses

Mass calibration for all ICP/MS internal standards was within 0.1 atomic mass unit of the true mass. ICP/MS resolution was less than 0.9 amu full width at 10 percent peak height.

b) CRI/CRA Standards

Instrument calibration was verified using low level standards near the project required detection limit

c) Initial and Continuing Calibration Verification

All inductively coupled plasma (ICP) and ICP/MS results met control limits of 90 to 110 percent recovery (percent R) of the true values for both initial and continuing calibration

Mercury cold vapor AA (CVAA) results met control limits of 80 to 120 percent recovery (percent R) for both initial and continuing calibration

3. Instrument Detection Limits

All instrument detection limits (IDL) for ICP, ICP/MS, and mercury analyses met project requirements specified in the project Sampling and Analysis Plan

This document was prepared by Roy F. Weston, Inc. expressly for the EPA. It shall not be disclosed in whole or in part without the express, written permission of the EPA.



QA Review Batch K9805693 (Inorganics/Metals)

Site Duwamish River

Page 3

4 Blanks

a) Laboratory Method Blanks

Method blanks were analyzed at the required frequency. The following analytes were detected in the method blanks:

Blank ID	Analyte	Concentration	Associated Samples
K9805693-MB	Lead	0.10 mg/Kg	98344086 through 98344099
K9805693-MB	Magnesium	2 mg/Kg	98344086 through 98344099
K9805693-MB	Nickel	0.05 mg/Kg	98344086 through 98344099
K9805693-MB	Tin	0.6 mg/Kg	98344086 through 98344099

Results for analytes listed above were qualified as undetected (UJ) if concentrations in associated samples were less than five times the concentration present in the blank.

b) Initial Calibration and Continuing Calibration Blanks

The following elements were found in calibration blanks.



QA Review Batch K9805693 (Inorganics/Metals)

Site: Duwamish River

Page 4

Blank ID	Analyte	Concentration	Associated Samples
CCB2	Nickel	0.06 µg/L	none
CCB3	Arsenic	-0.1 µg/L	98344086 through 98344090
CCB3	Cadmium	-0.02 µg/L	98344086 through 98344090
CCB3	Nickel	0.02 µg/L	98344086 through 98344090
CCB4	Thallium	0.006 µg/L	98344091 through 98344099
CCB5	Arsenic	0.1 µg/L	none

All sample results were greater than five times the calibration blank concentrations. No qualifiers were assigned based on calibration blank results.

c) Field Blanks

No field blank samples were associated with this laboratory batch

5. ICP and ICP/MS Interference Check

All analytes for the interference check samples were within the control limits of 80 to 120 percent of the true values. Internal standard intensities for analytes determined by ICP/MS were within ± 20 percent of the initial calibration intensity.

6. Laboratory Control Sample

Laboratory control sample recoveries were within the control limits (P-project, L-laboratory) for all analytes except the following

This document was prepared by Roy F. Weston, Inc. expressly for the EPA. It shall not be disclosed in whole or in part without the express, written permission of the EPA.



QA Review Batch K9805693 (Inorganics/Metals)

Site Duwamish River

Page 5

Analyte	% Recovery	QC Limit
Antimony	54	80-120 (P) 24-176 (L)
Iron	76	80-120 (P) 58-142 (L)

Results and detection limits for the above elements were qualified as estimated (J).

Recoveries were below the lower project QC limit, indicating potential low bias.

Undetected results are also qualified as estimated (UJ).

7 Laboratory Duplicate Sample Analysis

All relative percent differences (RPD) between analytical results were within the QC limit of 35 percent (or ± 2 times the quantitation limit for concentrations < 5 times the quantitation limit) for soil.

8 Spiked Sample Analysis

The matrix spike recoveries for the following analytes were outside QC limits:

Sample	Analyte	Percent Recovery	QC Limits
98344086MS	Antimony	32	75-125

For 98344086MS, recoveries were not calculated for Aluminum, Iron and Manganese as native sample concentrations exceeded the spike concentrations by more than 4 times. Results were not qualified solely on matrix spike results.



QA Review Batch K9805693 (Inorganics/Metals)

Site: Duwamish River

Page 6

9. ICP and ICP/MS Serial Dilution

Serial dilutions were not routinely performed for this SDG.

10. ICP/MS Quality Control

a) Duplicate Analysis

Duplicate analyses were not performed for this SDG.

b) Post Digest Spike Recovery

Post digest spikes were not performed for this SDG.

c) Method of Standard Additions

No samples required MSA analysis.

d) ICP/MS Internal Standards

The intensity of all internal standards was within limits of 30 to 120 percent of the initial calibration intensity for all samples

11. Field Duplicate Analysis

Samples 98344087 and 98344088 were field duplicates. The relative percent difference between duplicate results was within limits of 35 percent RPD

12. Sample Analysis

A cursory raw data review was performed. All laboratory deliverables were present and complete. The case narrative indicated that the MS recovery of Antimony for sample 98344086 was outside the QC limits because of suspected matrix interference. As the LCS recovery was acceptable, no further action was taken. The MS recoveries of Aluminum, Iron and Manganese in sample 98344086 were not calculated. The analyte concentrations in the sample were significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery. No other problems were noted.



QA Review Batch K9805693 (Inorganics/Metals)

Site: Duwamish River

Page 7

13. Laboratory Contact

No laboratory contact was required.

Data Assessment

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values.

Data Qualifiers

U - The material was analyzed for, but was not detected.

UJ - The analyte was not detected. The associated quantitation limit is an estimate because quality control criteria were not met

J - The analyte was positively identified, but the associated numerical value is an estimated quantity because quality control criteria were not met or because concentrations reported were less than the CRDL or lowest calibration standard.

R - Quality control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344086	Units	mg/Kg (ppm)
Lab Code	K9805693-001	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	21100	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	14 3	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	74	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 43	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 41	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	6180	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	29	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	9	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	57	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	31300	WT
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	31 4	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	8240	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	340	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 17	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	19 8	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2900	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	6	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 30	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	14000	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 12	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	4	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	63	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	117	

Approved By _____
 IS44mc/031693
 05693ICP GJ1 Sample 9/21/98

CP Date 9/22/98

WT 12/12/98

Page No. 0007

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344087						Units	mg/Kg (ppm)
Lab Code	K9805693-002						Basis	Dry
Test Notes								
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	19400
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND <i>WT</i>
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	11 1
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	64
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 37
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 31
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	5640
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	26
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	9
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	43
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	27300 <i>J</i>
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	20 8
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	7240
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	282
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 12
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	20 0
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2500
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	5
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 23
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	10800
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 09
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	3
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	59
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	90

WT 12/12/98

Approved By _____

IS44mc/031695

05693ICP GJ1 Sample (2) 9/21/98

Date *9/22/98*

Page No

0008

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344088	Units	mg/Kg (ppm)
Lab Code	K9805693-003	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	19000	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	UJ
Arsenic	EPA 3050B	200 8	0.5	0.1	10	9/4/98	9/18/98	12.2	
Barium	EPA 3050B	6010B	1	0.6	2	9/4/98	9/17/98	67	
Beryllium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.38	
Cadmium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.35	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	5650	
Chromium	EPA 3050B	6010B	2	0.7	2	9/4/98	9/17/98	26	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	9	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	46	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	27600	J
Lead	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	22.0	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	7480	
Manganese	EPA 3050B	6010B	1	0.4	2	9/4/98	9/17/98	289	
Mercury	7471A	7471A	0.05	0.02	1	9/9/98	9/10/98	0.12	
Nickel	EPA 3050B	200 8	0.2	0.02	10	9/4/98	9/18/98	20.2	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2600	
Selenium	EPA 3050B	200 8	1	0.3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	0.25	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	11300	
Thallium	EPA 3050B	200 8	0.02	0.006	10	9/4/98	9/18/98	0.11	
Tin	EPA 3050B	200 8	2	0.05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0.6	2	9/4/98	9/17/98	57	
Zinc	---	6010B	2	0.8	2	9/4/98	9/17/98	95	

Approved By _____

IS44mc/031695

05693ICP G1 Sample (1) 9/21/98

Date 9/22/98

Page No. 0059

WGT 12/12/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344089	Units	mg/Kg (ppm)
Lab Code	K9805693-004	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	13500	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	10	J
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	9 3	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	119	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 26	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 16	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4360	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	19	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	36	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	20000	J
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	31 7	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	5050	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	247	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 09	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	13 3	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1700	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	4	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 17	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	8060	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 07	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	48	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	82	

mg/r/mg

Approved By _____ *qc* Date *1/24/98*

IS44mc/031695
 05693 ICP GJ1 - Sample (4) 9/21/98

0010

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344090	Units	mg/Kg (ppm)						
Lab Code	K9805693-005	Basis	Dry						
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	11100	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0.5	0.1	10	9/4/98	9/18/98	9.9	
Barium	EPA 3050B	6010B	1	0.6	2	9/4/98	9/17/98	37	
Beryllium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.23	
Cadmium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.12	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	3830	
Chromium	EPA 3050B	6010B	2	0.7	2	9/4/98	9/17/98	15	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	5	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	28	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	19900	J
Lead	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	23.3	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	4500	
Manganese	EPA 3050B	6010B	1	0.4	2	9/4/98	9/17/98	254	
Mercury	7471A	7471A	0.05	0.02	1	9/9/98	9/10/98	0.08	
Nickel	EPA 3050B	200 8	0.2	0.02	10	9/4/98	9/18/98	12.1	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1200	
Selenium	EPA 3050B	200 8	1	0.3	10	9/4/98	9/18/98	4	
Silver	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	0.15	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	7320	
Thallium	EPA 3050B	200 8	0.02	0.006	10	9/4/98	9/18/98	0.06	
Tin	EPA 3050B	200 8	2	0.05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0.6	2	9/4/98	9/17/98	38	
Zinc	EPA 3050B	6010B	2	0.8	2	9/4/98	9/17/98	58	

WT 12/12/98

Approved By

IS44mc/031695
05693ICP GJ1 Sample (5) 9/21/98

T

Date

9/22/98

000.11

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344091	Units	mg/Kg (ppm)				
Lab Code	K9805693-006	Basis	Dry				
Test Notes							
Analyte	Prep Method	Analysis Method	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98 12200
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98 ND uJ
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98 6 1
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98 39
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98 0 26
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98 0 21
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98 3890
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98 15
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98 6
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98 29
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98 15500 J
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98 13 6
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98 4460
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98 181
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98 0 17
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98 12 7
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98 1500
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98 4
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98 0 20
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98 7100
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98 0 08
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98 2 J
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98 40
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98 57

Approved By _____

1S44mc071695

05693ICP GJ Sample (6) 9/21/98

JL

Date 9/22/98

mgt 12/12/98

Page No. 00012

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344092	Units Basis	mg/Kg (ppm) Dry						
Lab Code	K9805693-007								
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	12500	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	8 9	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	32	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 25	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 12	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4200	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	17	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	30	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	18900	T
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	18 3	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	4830	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	299	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 08	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	14 2	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1500	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	4	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 14	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	6950	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 05	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	4	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	44	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	71	

WT 9/21/98

Approved By _____
 IS44mc/031695
 05693ICP GJ1 Sample (7) 9/21/98

jc

Date 9/22/98

Page No. 00013

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344093	Units	mg/Kg (ppm)						
Lab Code	K9805693-008	Basis	Dry						
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	18200	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	UCJ
Arsenic	EPA 3050B	200 8	0.5	0.1	10	9/4/98	9/18/98	8.5	
Barium	EPA 3050B	6010B	1	0.6	2	9/4/98	9/17/98	56	
Beryllium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.36	
Cadmium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.35	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	5120	
Chromium	EPA 3050B	6010B	2	0.7	2	9/4/98	9/17/98	24	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	8	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	44	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	23200	J
Lead	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	25.6	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6510	
Manganese	EPA 3050B	6010B	1	0.4	2	9/4/98--	9/17/98	228	
Mercury	7471A	7471A	0.05	0.02	1	9/9/98	9/10/98	0.15	
Nickel	EPA 3050B	200 8	0.2	0.02	10	9/4/98	9/18/98	18.1	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2300	
Selenium	EPA 3050B	200 8	1	0.3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	0.29	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	9890	
Thallium	EPA 3050B	200 8	0.02	0.006	10	9/4/98	9/18/98	0.09	
Tin	EPA 3050B	200 8	2	0.05	10	9/4/98	9/18/98	4	
Vanadium	EPA 3050B	6010B	2	0.6	2	9/4/98	9/17/98	56	
Zinc	EPA 3050B	6010B	2	0.8	2	9/4/98	9/17/98	93	

mg/r/r/98

Approved By _____
 IS44mc/071695
 05694ICP GJ1 Sample (8) 9/21/98

JC

Date 9/22/98

00014

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344094	Units	mg/Kg (ppm)
Lab Code	K9805693-009	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	11500	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WJ
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	6 7	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	33	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 24	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 16	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	3770	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	16	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	27	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	17800	J
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	21 1	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	4600	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	215	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 07	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	16 5	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1300	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	4	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 14	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	5690	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 05	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	2	J 4
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	41	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	69	

mg/12/12/98

Approved By _____
IS44mc/011695
05693ICP GJ1 - Sample (9) 9/21/98

Jc Date 9/22/98

00015

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344095							Units	mg/Kg (ppm)
Lab Code	K9805693-010							Basis	Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	14600	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	US
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	8 5	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	41	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 30	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 21	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4460	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	20	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	33	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	21300	J
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	24 4	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	5540	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	225	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 12	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	15 3	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1500	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 18	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	7690	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 07	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	4	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	49	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	77	

WGT 12/12/98

Approved By _____
 IS44mc/031695
 05693ICP GJ1 Sample (10) 9/21/98



Date 9/22/98

00016

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344096	Units	mg/Kg (ppm)
Lab Code	K9805693-011	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	14600	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	8 2	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	43	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 30	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 25	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4550	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	20	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	43	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	21100	T
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	27 7	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	5480	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	264	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 13	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	16 6	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1600	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 17	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	6650	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 06	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	4	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	51	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	79	

WT 12/12/98

Approved By

IS44mc/031695
05693ICP GJ1 Sample (11) 9/21/98*JK*

Date 9/22/98

00017

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344097	Units	mg/Kg (ppm)
Lab Code	K9805693-012	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	16700	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WS
Arsenic	EPA 3050B	200 8	0.5	0.1	10	9/4/98	9/18/98	12.2	
Barium	EPA 3050B	6010B	1	0.6	2	9/4/98	9/17/98	.57	
Beryllium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.34	
Cadmium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.33	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4890	
Chromium	EPA 3050B	6010B	2	0.7	2	9/4/98	9/17/98	23	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	8	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	47	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	22800	J
Lead	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	21.6	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	6350	
Manganese	EPA 3050B	6010B	1	0.4	2	9/4/98	9/17/98	239	
Mercury	7471A	7471A	0.05	0.02	1	9/9/98	9/10/98	0.13	
Nickel	EPA 3050B	200 8	0.2	0.02	10	9/4/98	9/18/98	18.4	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2000	
Selenium	EPA 3050B	200 8	1	0.3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	0.23	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	9010	
Thallium	EPA 3050B	200 8	0.02	0.006	10	9/4/98	9/18/98	0.09	
Tin	EPA 3050B	200 8	2	0.05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0.6	2	9/4/98	9/17/98	50	
Zinc	EPA 3050B	6010B	2	0.8	2	9/4/98	9/17/98	102	

mg T 12/12/98

Approved By

1844Inc/031695

056931CP GJ1 Sample (12) 9/21/98

SP

Date 9/22/98

C0018

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344098	Units Basis	mg/Kg (ppm) Dry						
Lab Code	K9805693-013								
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	13000	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0.5	0.1	10	9/4/98	9/18/98	9.6	
Barium	EPA 3050B	6010B	1	0.6	2	9/4/98	9/17/98	54	
Beryllium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.27	
Cadmium	EPA 3050B	200 8	0.02	0.02	10	9/4/98	9/18/98	0.41	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	4260	
Chromium	EPA 3050B	6010B	2	0.7	2	9/4/98	9/17/98	22	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	7	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	40	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	19400	T
Lead	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	28.6	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	5500	
Manganese	EPA 3050B	6010B	1	0.4	2	9/4/98	9/17/98	170	
Mercury	7471A	7471A	0.05	0.02	1	9/9/98	9/10/98	0.15	
Nickel	EPA 3050B	200 8	0.2	0.02	10	9/4/98	9/18/98	20.8	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	1400	
Selenium	EPA 3050B	200 8	1	0.3	10	9/4/98	9/18/98	4	
Silver	EPA 3050B	200 8	0.02	0.004	10	9/4/98	9/18/98	0.35	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	6820	
Thallium	EPA 3050B	200 8	0.02	0.006	10	9/4/98	9/18/98	0.08	
Tin	EPA 3050B	200 8	2	0.05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0.6	2	9/4/98	9/17/98	40	
Zinc	EPA 3050B	6010B	2	0.8	2	9/4/98	9/17/98	92	

mg/12/12/98

Approved By _____
 1S44mc/031695
 05693ICP GJ1 - Sample (13) 9/21/98

GJ Date 9/22/98

00019

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805693
Date Collected: 8/20/98
Date Received: 8/21/98

Total Metals

Sample Name	98344099							Units	mg/Kg (ppm)
Lab Code	K9805693-014							Basis	Dry
Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Notes
Aluminum	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	18400	
Antimony	EPA 3050B	6010B	10	5	2	9/4/98	9/17/98	ND	WT
Arsenic	EPA 3050B	200 8	0 5	0 1	10	9/4/98	9/18/98	11 0	
Barium	EPA 3050B	6010B	1	0 6	2	9/4/98	9/17/98	65	
Beryllium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 37	
Cadmium	EPA 3050B	200 8	0 02	0 02	10	9/4/98	9/18/98	0 41	
Calcium	EPA 3050B	6010B	10	3	2	9/4/98	9/17/98	5370	
Chromium	EPA 3050B	6010B	2	0 7	2	9/4/98	9/17/98	30	
Cobalt	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	9	
Copper	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	45	
Iron	EPA 3050B	6010B	4	4	2	9/4/98	9/17/98	26100	J
Lead	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	24 4	
Magnesium	EPA 3050B	6010B	2	2	2	9/4/98	9/17/98	7280	
Manganese	EPA 3050B	6010B	1	0 4	2	9/4/98	9/17/98	274	
Mercury	7471A	7471A	0 05	0 02	1	9/9/98	9/10/98	0 13	
Nickel	EPA 3050B	200 8	0 2	0 02	10	9/4/98	9/18/98	19 9	
Potassium	EPA 3050B	6010B	400	400	2	9/4/98	9/17/98	2300	
Selenium	EPA 3050B	200 8	1	0 3	10	9/4/98	9/18/98	5	
Silver	EPA 3050B	200 8	0 02	0 004	10	9/4/98	9/18/98	0 27	
Sodium	EPA 3050B	6010B	20	20	2	9/4/98	9/17/98	11400	
Thallium	EPA 3050B	200 8	0 02	0 006	10	9/4/98	9/18/98	0 09	
Tin	EPA 3050B	200 8	2	0 05	10	9/4/98	9/18/98	3	
Vanadium	EPA 3050B	6010B	2	0 6	2	9/4/98	9/17/98	55	
Zinc	EPA 3050B	6010B	2	0 8	2	9/4/98	9/17/98	96	

Approved By _____ Date _____

IS44Inc/01/695

05693ICP G11 - Sample (14) 9/21/98

00020

mgT 12/12/98